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O. W. R. C.
Water Pollution
Survey

THE
ONTARIO WATER RESOURCES
COMMISSION



WATER POLLUTION SURVEY

of the

VILLAGE OF BRUSSELS

COUNTY OF HURON

1969

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REPORT
ON
WATER POLLUTION SURVEY
of the
VILLAGE OF BRUSSELS
COUNTY OF HURON

Date of Sampling - February 17-19, 1969

ONTARIO WATER RESOURCES COMMISSION
DIVISION OF SANITARY ENGINEERING

REPORT

ONTARIO WATER RESOURCES COMMISSION

INTRODUCTION

A water pollution survey was conducted in the Village of Brussels on February 17-19, 1969 in an effort to locate and evaluate all existing sources of pollution. Such surveys are performed routinely and upon request by the OWRC's Division of Sanitary Engineering as a basis for determining water supply and sewage treatment requirements.

Acknowledgement is here given to the following persons who provided assistance and information necessary for the compilation of this report:

Mr. W. King, Clerk-Treasurer, Village of Brussels
Mr. D. Hastings, Foreman, Village of Brussels
Mr. D. L. Turnbull, Manager, Huron Food Products Limited

At the time of the survey the sky was sunny and the temperature was about 34 degrees F. No rain had been recorded in the area during the preceding several days and the ground was covered with a heavy fall of snow.

I GENERAL INFORMATION

The Village of Brussels is located in the north-east portion of the County of Huron on the border between the Townships of Morris and Grey. The Middle Maitland River flows north-westerly through the centre of the municipality and unites with

the Little Maitland River about two miles south of Wingham. The Middle Maitland River continues in its course and makes a juncture with the Maitland River in Wingham.

According to the 1968 Municipal Directory the population of the village was 832 persons and the total assessment amounted to \$749,000. No sizable population growth is expected in the foreseeable future. Approximately 62 per cent of the population is located south of the river while the remaining 38 per cent resides on the north side.

There are three small industries in the locality, namely, Huron Food Products Limited, Topnotch Feeds, and McDonald Lumber. In general the economy of the village is based almost entirely on retail outlets and services. A Canadian National Railways line connects Brussels with Wingham and Listowel.

The whole area is underlain by the Norfolk formation which consists of grey, brownish-grey and brown, crystalline to fine grained limestone, magnesian limestone and dolomite in fairly even beds varying in thickness. The bedrock is covered by a medium-textured till to a depth of about 30 ft. The overburden belongs to the Grey-Brown Podzolic great soil group. The topography in the southern portion of the village is strongly undulating and the soil is slightly stony Harriston loam which is well drained and fairly well supplied with plant nutrients. The

topography in the northern part of the municipality is undulating and the soil is slightly stony Listowel loam which is imperfectly drained and possessing a medium fertility level. Both soils are used for general farming, with both beef and dairy cattle being raised on the farms.

II WATER USES

1. Municipal Water System

A municipal water system was constructed in 1951 and consisted of a 204 ft. deep drilled well equipped with a 150 Igpm Wintroath vertical turbine pump which transferred water to a 100,000 gallon concrete reservoir. From there a 150 Igpm Smart-Turner centrifugal pump or a 750 Igpm gasoline driven standby pump discharged untreated water into the system. The distribution system consisted of 4561 ft. of 8-inch diameter and 20,233 ft. of 6-inch diameter mains, 41 hydrants, and 76 valves. No changes were made to the facilities until 1965 when a 198 ft. deep drilled well was constructed in the north section of the village. This standby well was equipped with a Jacuzzi 200 USgpm vertical turbine pump which discharges water directly into the system. In 1967 the pump on the main well in the south section of the municipality was replaced by a Deming 200 USgpm vertical turbine pump.

Most of the residences are served by the system which has 273 services. There are reportedly only several private

well supplies in the village, each serving single dwellings. Based on a total water pumpage of 41.0 MG and a population of 832, the average per capita water consumption during 1968 was 135 gpcd.

2. Recreational Water Uses

The Middle Maitland River, upstream and downstream of the village, is used for occasional fishing but does not provide suitable conditions for bathing.

3. Agricultural Uses

The Middle Maitland River originates in farmlands to the south-east of the village in the Township of Grey and flows in a north-westerly direction through farmlands downstream of the municipality in the Township of Morris. Under these circumstances it can be assumed that river water is employed for cattle watering.

III WATER POLLUTION

1. Sanitary Waste Disposal

Domestic sewage disposal facilities consist of individual septic tanks and tile fields or cesspools. The lots which house these septic tank systems are either 82.5 ft. x 165 ft. deep or 66 ft. x 165 ft. deep. On the north side of the river about 40 per cent of the lots are 82.5 x 165 ft. and the remaining 60 per cent are 66 x 165 ft. On the south side of the river the majority of the lots are 82.5 x 165 ft.

Since the Ontario Department of Health recommends at least 150 ft. of 18 inch wide trench and tile along with a minimum of 6 ft. of undisturbed earth between the trenches, it would appear that the lot areas available are sufficient for tile fields as long as single dwellings are situated thereon. However, in the closely built commercial area, sufficient space would probably not be available for the installation of suitable tile fields.

The municipality is served by 6 separate storm sewers which all outfall into the Middle Maitland River. For convenience these sewers are displayed on the accompanying map as well as here summarized:

<u>Sewer</u>	<u>Type</u>
John Street	12 inch tile
Turnberry Street	14 inch tile
Elizabeth Street	8 & 10 inch tile
Holiday Street	14 inch tile
William Street	8 & 12 inch pipe
Elm Street	14 inch tile

It was reported that the Holiday Street and Elm Street sewers primarily discharge farm drainage whereas the majority of flow in the William Street sewer originates from an overflowing well. Because of septic tank discharges into the Turnberry Street sewer which is located in the village's commercial area, sewage smells occur in the summer, thus requiring special maintenance. The Elizabeth Street sewer drains several catch basins as it

passes through a residential area served by septic tank systems. Effluent was being discharged from all these sewers at the time of the survey and physical evidence indicated the presence of domestic sewage in some instances.

The results of laboratory analyses performed on samples collected during the survey are shown in a later portion of this report. These confirm the presence of sanitary sewage in varying concentrations in the storm sewer system.

2. Industrial Wastes Disposal

The only source of industrial pollution is Huron Food Products Limited, formerly known as Cousins Creamery. This industry is owned by Mr. Ralph Walker (Walkerton), Mr. Eric Cluley (Durham), and Mr. Grant Elliot (Dundalk) and is managed by Mr. Delford L. Turnbull.

A flowing artesian drilled well serves as the source of water supply. A Jacuzzi positive displacement pump driven by a 0.75 HP Wagner-Leland electric motor transfers water to a 150 gallon capacity pressure tank which serves the plant. It is estimated that approximately 50,000 gallons of water are used daily, of which 95 per cent is used exclusively for cooling purposes.

Since the time of the 1964 water pollution survey until September 1968, both milk and cream were being processed at the plant. However, milk processing ceased at that time and now only cream, ice cream mix, and ice cream are manufactured. This has

reportedly reduced the amount of wash water from 10 to 5 per cent of the total water consumption.

All clean-up water is passed through a two compartment septic tank and is then combined with the cooling water for discharge through a tile drain to the Middle Maitland River. The necessary equipment for a spray irrigation system was secured in 1964 by the former owner but was not to be used until alterations to the plant drainage system could be made so as to ensure the separation of contaminated and uncontaminated wastewaters. In this manner it was hoped that the necessity of disposing of the total waste flow through the spray system could be eliminated. Although these were the plans, it appears that these changes were never initiated. It is even doubtful whether all parts of the spray system are still available since they could not be produced during the latest survey. Then too, it may be that since the proposed spray area is a piece of land about 300 ft. wide located between the plant and the river, satisfactory utilization of a spray system may not be possible.

The extent of pollution arising from operations at this creamery is discussed in a later section of this report.

3. Refuse Disposal

A refuse disposal site is situated at the north-west limits of the municipality. In the summer the refuse is burned and covered with soil, whereas in the winter the trash is just

burned. No contamination of the river or any watercourse was observed arising from operations at the site.

IV ANALYSES RESULTS

1. Terms

Coliforms per 100 ml

Coliform bacteria are commonly found in the intestinal tract of man and animals and in the fecal discharges from these sources. In polluted water their concentration is roughly proportional to the degree of sewage contamination present. The objective for natural waters is a concentration of not more than 2400 organisms per 100 millilitres.

Biochemical Oxygen Demand

The Biochemical Oxygen Demand (BOD) is a measure of the amount of oxygen required for the stabilization of decomposable organic matter present in sewage. OWRC objectives allow concentrations in natural waters and waste discharges of no greater than 4.0 and 15.0 parts per million (ppm) respectively.

Alkylbenzene Sulphonate

Alkylbenzene Sulphonate (ABS) is a surfactant extensively used in detergents and so is present in domestic sewage at levels averaging about 10 parts per million (ppm). Rivers usually average about 0.1 ppm or less and ground waters range from zero to several parts per million depending upon their proximity to sewage entry points.

2. Discussion

Table I, appended to this report, provides a summary of the results of the chemical analysis and bacteriological examination of the samples collected during the survey.

BOD, ABS, and coliform concentrations in the John Street, Turnberry Street, Elizabeth Street, and Elm Street sewers were sufficient to indicate the presence of domestic sewage. The most severely contaminated storm sewer proved to be the Turnberry Street sewer which serves the main commercial area. As regards the drain from the creamery, pollution appeared to have decreased since the previous pollution survey in 1964. The cooling waters seemed to be providing sufficient dilution to the washwater at the time of the latest survey.

It is interesting to note the presence of a substantial concentration of ABS in the ground water at sampling point #2 since it indicates the presence of domestic sewage from septic tanks in the area. Bacterial action has reduced the BOD and bacterial concentrations but the ABS has persisted because of not being bio-degradable.

V PROPOSED SEWAGE WORKS

On August 5, 1966 a preliminary report on a sanitary sewer system for the municipality was submitted by Skelton, Gibson, and Associates, Consulting Engineers. The design population of 1600 persons included a 50 per cent increase in

population as well as the effects of industrial wastes.

Basically, a gravity system was proposed, wherein the flow from the entire village would be brought to one central point in the vicinity of the bridge crossing the Middle Maitland River.

From this point sewage would be pumped to the lagoon area.

Rather than constructing the oxidation ponds in increments, it was recommended to build all cells initially to serve the design population of 1600. The entire scheme to serve all existing streets was estimated to cost \$547,000.

As regards financing, it was estimated that there would be about 38,000 ft. of assessable frontage which would produce \$304,000 at a rate of \$8.00 per ft. Revenue for 465 private drain connections would amount to \$61,700 at a cost of \$132.80 each. A surcharge on the water bill levied on a flat rate basis of \$10.00 per connection annually would produce \$50,000 for 250 connections over 20 years. An arbitrary figure of \$10,000 was used to assess extra expenses incurred to the municipality because of industrial wastes. This amount could be paid by the industry as an initial lump sum or a yearly assessment. The net subsidy arising from a Central Mortgage and Housing loan on \$185,000 of subsidizable works was calculated to be approximately \$36,000. A summary of all five sources of revenue produced a total of \$451,700. Thus the amount to be raised by mill rate would be \$95,700. A 7 mill increase on

village assessment was therefore thought to be sufficient to re-pay this sum over the 20 year period.

Since the report was submitted in 1966, no further action has been taken by the municipality to construct a sanitary sewage system and treatment facilities.

VI SUMMARY

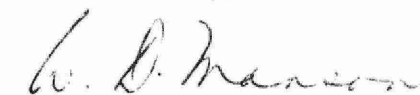
On February 17-19, 1969 a water pollution survey was conducted in the Village of Brussels. As shown in the previous survey of 1964 and during the present study, pollution of the Middle Maitland River by domestic and industrial wastes is continuing. The ultimate solution appears to be the installation of a sanitary sewer system along with adequate treatment facilities, perhaps similar to the type recommended in the 1966 consulting engineers report to the municipality.

VII RECOMMENDATION

It is recommended that the municipality proceed with the construction of a sanitary sewage system and treatment works as soon as possible.

mj

Prepared by:



W. D. Manson, Engineer
Division of Sanitary Engineering

TABLE I

VILLAGE OF BRUSSELS
WATER POLLUTION SURVEY
SEWAGE ANALYSIS RESULTS

DATE 1969	SAMPLING POINT NUMBER	DESCRIPTION	5-DAY BOD	ANIONIC DETERGENTS AS ABS	SOLIDS			COLIFORMS PER 100 ml	ESTIMATED FLOW (GPH)
					TOTAL	SUSPENDED	DISSOLVED		
Feb.7	1	Middle Maitland River dam	1.0	0.3	270	5	265	524	-
"	2	Flowing rock spring	0.6	2.5	410	2	408	608	572
"	3	12-inch diameter outfall for John St. sewer	14	1.0	460	10	450	1,050,000	114
Feb.19	4	12-inch diameter outfall for William St. sewer	1.0	0.0	1070	-	-	160	-
Feb.17	5	14-inch diameter outfall for Turnberry St. sewer	45	1.6	1950	70	1880	1,500,000	1420
Feb.19	6	10-inch diameter outfall for Elizabeth St. sewer	13	4.0	1710	150	1560	330,000	44

TABLE I - cont'd

VILLAGE OF BRUSSELS
WATER POLLUTION SURVEY
SEWAGE ANALYSIS RESULTS

DATE 1969	SAMPLING POINT NUMBER	DESCRIPTION	5-DAY BOD	ANIONIC DETERGENTS AS ABS	SOLIDS			COLIFORMS PER 100 ml	ESTIMATED FLOW (GPH)
					TOTAL	SUSPENDED	DISSOLVED		
Feb.18	7	Effluent ditch from overflowing spring	1.0	0.4	280	1	279	<4	328
"	8	8-inch diameter outfall for Huron Food Products Limited septic tank	13	0.4	320	20	300	560,000	654
"	9	8-inch diameter corrugated metal outfall emptying into ditch	1.4	0.1	590	5	585	10,400	245
"	10	16-inch diameter outfall for Holiday St. sewer	1.2	0.2	370	5	365	19,400	8300
"	11	24-inch diameter outfall for Elm Street sewer	5.0	1.0	990	30	960	138,000	238
"	12	Middle Maitland River downstream of village	0.6	0.0	440	2	438	270	-



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